(2) Section 1 (3 to 7) does not apply to the employment of young people provided
1. this is necessary for the purpose of their training,
2. their safety is assured by supervision by a skilled person

and

3. ... .

(3) ... "

For Section 6 (2)

A criterion for live work is that the affected parts of the installation be defined and that the employees' attention be drawn accordingly to the permissible working area. This includes marking of the place of work/working area and, if necessary, the route to the place of work within the electrical installation.

The isolated state must be brought about prior to the commencement of work and safeguarded at the place of work for the duration of the work in observance of the following five safety rules, application of which must be the norm:

1. *Disconnect from the power supply*
2. *Take the necessary means to prevent reclosing oft he isolating switches*
3. *Test absence of voltage by approved means*
4. *Ensure earthing and short-circuiting by approved means*
5. *Protect adjacent live parts by covers and barriers and fit a suitable warning notice*

The measures to be taken in particular consideration of the conditions in the plant and on site, for example the presence of high-voltage or low-voltage overhead lines, cables or switchgear, are set out in detail in the electrical rules (see Annex 3).

During work with cable spiking guns or cable cutters, particularly unfavourable circumstances may result in the device being live following spiking or cutting. This voltage often cannot be detected by conventional voltage testers rated for the rated voltage of the installation. Suitable organizational measures, such as consultation of the grid management body, should therefore be taken before clearance is given for commencement of the work, in order to ascertain as clearly as possible whether the cable-spiking gun or cable cutter may become live.

For Section 6 (3)

Should parts of the installation in the vicinity of the place of work not be isolated, the same safety measures must be taken prior to commencement of work as for work in the vicinity of live parts (refer to the instructions for implementation for Section 7).

Work in the vicinity of live parts

Section 7

With the exception of the provisions formulated in Section 8, work may be performed in the vicinity of live parts of electrical installations and equipment which are not protected against direct contact only if:

- they have been disconnected from the power supply and reclosing is prevented for the duration of the work;

  or

- the live parts have been protected for the duration of the work by covering or fencing, in particular consideration of the voltage, location of operation, form of work and work materials used;

  or

- where the above measures are not applied, the permissible approach distance is not violated.

Instruction for implementation for Section 7:

Work performed in the vicinity of live parts encompasses tasks of any kind in which a person may violate, with parts of the body or with objects, the working clearances indicated in Table 4 from live parts not fully protected against direct contact, without touching live parts or, in the case of rated voltages above 1 kV, without reaching the danger zone. The requirement concerning protection by covering or fencing is met:

– *at rated voltages up to 1 000 V when live parts are shrouded or enclosed such as to be isolated with the effect that at least partial protection is provided against direct contact;*

– *at rated voltages over 1 kV when live parts are shrouded or fenced. It must be ensured that the boundary of the danger zone D_L stated in Table 2 cannot be reached. The boundary of the danger zone is the minimum clearance in air. Reaching of the outer boundary of the danger zone shall be deemed equivalent to contact with the live part.*

Rated system voltage U_n (rms value) kV	Outer boundary of the danger zone D_{L}[2] (clearance in air) mm		Rated switching impulse withstand voltage U_{imp} (crest value) kV
	Indoor installation	Outdoor installation	
‹ 1	No contact		4
3	60	120	40
6	90	120	60
10	120	150	75
15	160		95
20	220		125
30	320		170
36	380		200
45	480		250
66	630		325
70	750		380
110	1 100		550
132	1 300		650
150	1 500		750
220	2 100		1 050
275	2 400		850
380	2 900/3 400		950/1 050
480	4 100		1 175
700	6 400		1 550

[1] The values stated for D_L apply to the maximum rated switching impulse withstand voltage; for other values for lower rated voltages, see DIN VDE 0101

Table 2 Danger zone D_L, depending upon the rated voltage (DIN VDE 0105 Part 100)

The mechanical strength of protective equipment must be adequately dimensioned. Where the danger zone is constrained by protective equipment (e.g. partitions, insulating barriers), the electric strength must be observed.

The requirement concerning the permissible approach distance (protection by clearance) is met for example when it is ensured that:

- *at rated voltages up to 1 000 V, live live parts cannot be touched;*
- *at rated voltages over 1 kV, the boundary of the danger zone indicated in Table 2 cannot be reached;*
- *during certain electrical work, the working clearances indicated in Table 3 are not violated.*

Rated mains voltage U_n (rms value) kV	Working clearance (clearance in air to exposed live parts) m
Up to 1	0.5
› 1 ≤ 30	1.5
› 30 ≤ 110	2.0
› 110 ≤ 220	3.0
› 220 ≤ 380	4.0

Table 3 Working clearances during certain electrical work according to the rated voltage in the vicinity of live parts

The working clearances indicated in Table 3 apply to the following tasks when performed by electrically skilled persons or instructed persons or under the supervision of such persons:

- *the moving of ladders and bulky objects in the vicinity of overhead lines;*
- *the raising and lowering of tools, materials, etc., where overhead lines or lines in outdoor installations beneath a place of work must remain live;*
- *work on an overhead line circuit when several circuits (systems) with rated voltages in excess of 1 kV share common masts;*
- *coating and repair work on masts, portals, etc., of overhead lines, under particular conditions which are described in the electrical rules;*
- *work on outdoor installations.*

SUPERVISOR MUST

Supervision *is the continuous monitoring of the required safety measures during performance of the work at the site of work. The supervising person may only conduct work that does not impair his or her supervision.*

Shrouds, fences and clearances must be dimensioned in particular consideration of the fact that employees must also not touch live live parts in the case of voltages up to 1 000 V or reach the boundary of the danger zone in accordance with Table 2 in the case of rated voltages exceeding 1 kV as a result of unintended or unconscious movements, dependent for example upon

- *the nature of the work;*
- *the available freedom of movement;*
- *the site;*
- *the tools used;*
- *the auxiliary equipment and materials;*

or owing to unchecked movement of tools, auxiliary equipment, materials or waste, caused for example by

- *slipping;*
- *dropping;*
- *flicking away;*
- *bumping.*

During non-electrical work, such as construction, assembly, transport, coating and repair work, during scaffolding work, or during work involving hoists, construction machinery, materials handling equipment or other devices and auxiliary construction equipment, the requirement for the permissible approach distance (protection by clearance) is for example met when the working clearances shown in Table 4 are not violated.

In exceptional cases, the working clearances shown in Table 4 may be reduced to those shown in Table 3 if the work is conducted under the supervision of electrically skilled persons or instructed persons employed by the operator of the electrical installation concerned.

Supervision *must be performed continuously and exclusively: no other tasks may be performed at the same time.*

Rated mains voltage U_n (rms value) kV	Working clearance (clearance in air to exposed live parts) m
Up to 1	1.0
› 1 ≤ 110	3.0
› 110 ≤ 220	4.0
› 220 ≤ 380	5.0

Table 4 Working clearances for non-electrical work, according to the rated voltage

The working clearances shown in Table 4 must also be observed when loads, suspension elements and load-handling attachments deflect outwards. Consideration must also be given to the deflection of the overhead conductor.

Permissible digressions

Section 8

Digression from the requirements of Sections 6 and 7 is permissible if

1. a risk of electric shock or arcing can be excluded owing to the type of installation
   or
2. for compelling reasons, the isolated state cannot be brought about, provided:
   - the auxiliary equipment or tools employed for this work are of such type that a risk of electric shock or arcing is excluded;
     and
   - the employer charges only suitably technically qualified persons with the work on these live parts;
     and
   - the employer specifies and implements further technical, organizational and personal safety measures which assure adequate protection against a risk of electric shock or arcing.

Instructions for implementation for Section 8 (1):

A risk of electric shock or arcing is excluded when:

– *the current flowing through the human body in the event of contact or the energy at the site of work remains below the limit values specified in the electrical rules;*

or

– *the voltage does not exceed the permissible limit values stated in the electrical rules for work on live live parts for the application and site of operation concerned.*

Where no limit values are set out in the electrical rules, live working may be performed where:

– *the short-circuit current at the site of work does not exceed 3 mA AC (rms value) or 12 mA DC;*
– *the energy at the site of work does not exceed 350 mJ;*
– *potential bridging is prevented by isolation of the site or of the live parts or by equipotential bonding;*
– *the touch voltage is lower than 50 V AC or 120 V DC;*

or

– *the values for the discharge current specified in the comparable electrical rules are not exceeded on the test equipment employed.*

For Section 8 (2):

Compelling reasons may exist when owing to the absence of the voltage:

– *a risk is presented to human life or health;*
– *considerable financial loss would be incurred by businesses;*

– *during work on power supply grids, particularly during the creation of connections, line switching, or the replacement of meters, ripple control receivers or time switches, the power supply would be interrupted;*
– *railway traffic would be disrupted or interrupted during work on or in the vicinity of overhead lines;*
– *telecommunications installations, including information processing installations or essential parts of them, would have to be shut down owing to work on power supply systems, potentially presenting a hazard to human life or health;*

  or

– *faults would be triggered in traffic signals installations which could endanger human life or health or lead to financial loss.*

Live work presents an elevated risk of electric shock and arcing. This gives rise to a need for particular technical and organizational measures. The residual risk (probability of occurrence and severity of injury, see DIN VDE 31000 Part 2) must be reduced to a permissible level. This is attained when the requirements stated below are met and the electrical rules are observed.

If live working is to be performed, the employer must set out the compelling reasons for it in writing for each intended task. Consideration must be given here to the work procedure selected, the frequency of the work and the qualification of the persons charged with performing it. A work instruction shall be drawn up for performance of the work and protective and auxiliary equipment suitable for live working made available.

During removal and insertion of live fuse links in the low-voltage high-breaking-capacity (NH) system which do not feature shock-hazard protection and load-switching capability, a risk of electric shock and arcing is largely excluded when plug-in NH handles with permanently attached gauntlet are used and face protection (mask) is worn.

Isolated tools and isolating auxiliary equipment for work on live parts are suitable when marked with the isolator symbol or with a double triangle and the associated voltage or voltage range or the class.

The requirements concerning the technical suitability of personnel for work on live parts are satisfied when for example the provisions indicated in Table 5 are observed and training for the live working has been provided. The knowledge and skills must be examined at regular intervals (of approximately 1 year), and training must be repeated or supplemented if necessary.

As part of the organizational safety measures, the work must be monitored by a person trained in first-aid who is at least an instructed person (see Section 26 of the BGV A1 accident prevention regulation concerning principles of prevention).

The safety measures must be set out in writing for each individual case or for defined, regularly recurring cases, in observance of the provisions found in the electrical rules.

Rated voltages	Work	SEP	PEI	L
≤ 50 V AC ≤ 120 V DC	All work for which a hazard, for example of arcing, is excluded	X	X	X
› 50 V AC › 120 V DC	1. Approach with test, measurement and adjustment tools, such as voltage testers, or with tools for the movement of parts requiring little force, or with actuating rods	X	X	
	2. Approach with tools and auxiliary equipment for the purpose of cleaning, and the fitting of suitable shrouds and fences	X	X	
	3. Use of suitable auxiliary equipment for the removal and insertion of fuse inserts not protected against direct contact, where safely possible	X	X	
	4. Spraying of live parts during firefighting or for cleaning purposes	X	X	
	5. Work on rechargeable batteries and photovoltaic installations in observance of suitable precautionary measures	X	X	
	6. Work on test installations and in laboratories in observance of suitable precautionary measures, where necessitated by the working conditions	X	X	
	7. Use of insulating rods to knock white frost clear	X	X	
	8. Locating of faults in control circuits (e.g. tracking of signals in circuits, bridging of partial circuits) and function testing of devices and circuits	X		
	9. Other work, when: a) compelling reasons have been identified by the operator and b) authority to issue instructions, responsibilities, working methods and working procedure (work instruction) have been set out in writing for specially trained personnel	X		
At all rated voltages	All work, when the circuits are equipped with adequate facilities for limitation of the current or energy and no particular hazards (such as explosion hazards) exist	X	X	X
	Work for the avoidance of major hazards, for example to human life and health or fire and explosion hazards	X		
	Work on telecommunications installations with remote current supplies operating at ‹ 10 mA AC or ‹ 30 mA DC	X	X	X

SEP: electrically skilled person PEI: instructed person L: layman

Table 5 General conditions for work on live parts with regard to the selection of personnel in consideration of the rated voltage

Administrative offences

MUSTER

Section 9
A person who deliberately or through negligence contravenes the regulations of
Section 3
Section 5 (1 to 3)
Sections 6, 7
commits an administrative offence in the sense of the German Social Code (SGB) VII
Section 209 (1) 1.

Entry into force

Section 10
The present accident prevention regulation enters into force on 1 April 1979. At the same time, the version of the VBG 4 accident prevention regulation issued 1 March 1962 concerning electrical installations and equipment is withdrawn.

Bonn, 25 January 1979
III b 6-3816.0-(27)-3715.1

German Federal Minister of Labour and Social Affairs

(seal)

pp.
Signed: Kliesch

Approval

The above accident prevention regulation concerning electrical installations and equipment (VBG 4) is approved.

Bonn, 25 January 1979
III b 6-3816.0-(27)-3715.1

German Federal Minister of Labour and Social Affairs

(seal)

pp.
Signed: Kliesch

☐ This version contains the following supplement:
First supplement issued 1 January 1997, approved 16 December 1996.

Annex 1

Adaptation of electrical installations and equipment to electrical rules

The formulation of different, more far-reaching requirements concerning new electrical installations and equipment in new editions of electrical rules does not of itself necessitate adaptation of the installations and equipment to these rules. The rules may however contain new provisions governing construction and equipment which, owing to particular accident risks or accidents that have actually occurred, have been adopted in VDE provisions. Adaptation of existing electrical installations to such electrical rules can then be a requirement.

Owing to avoidable particular accident risks, the following adaptations are required:

1. Implementation of partial shock-hazard protection for operating processes in accordance with DIN VDE 0106 Part 100, 3/83
   By 31 December 1999
2. Assurance of protection during operation of high-voltage installations to DIN VDE 0101, 5/89 Section 4.4
   By 31 October 2000
3. Adaptation of electrical installations on construction sites to BG Information concerning the selection and operation of electrical installations and equipment on construction sites (BGI 608)
   By 31 December 1997
4. Assurance of supplementary protection in test installations to DIN VDE 0104, 10/89 Sections 3.2 and 3.3.
   By 31 December 1997
5. Marking of mobile electrical equipment in accordance with BG Information concerning the selection and operation of mobile electrical equipment according to areas of application (BGI 600)
   By 30 June 1998

The following apply in particular to the states formerly in the GDR:

6. Changeover from three-phase plug-and-socket arrangements in accordance with the former DIN 49 450/451 (flat type plug and socket) to the round type plug-and-socket system to DIN 49 462/463
   By 31 December 1997
7. Adaptation of ISA 2000 indoor switchgear installations to BG Information concerning safe operation of ISA 2000 low-voltage indoor switchgear installations (BGI 755)
   By 31 December 1996/31 December 1999

8. Adaptation of protective and auxiliary equipment, where subject to electrical requirements, to the electrical rules
   By 31 December 1997
9. Disconnection of earthing installations in electrical distribution systems and consumer installations from water pipe systems
   By 31 December 1997
10. Equipping of bulb demonstration panels with supplementary protection to DIN VDE 0100 Part 559, 3/93 Section 6
    By 31 December 1997

Annex 2

Index of sources for literature

The sources for the rules and regulations listed in the instructions for implementation are provided below.

1. Acts and ordinances

Source:
Retail book trade
or
MAXDORNPRESSE GmbH & Co. KG,
Georg-Kerschensteiner-Straße 6, 63179 Obertshausen

2. BG Regulations and BG Information publications on safety and health at work

Source:
Deutsche Gesetzliche Unfallversicherung (DGUV),
Alte Heerstr. 111, 53757 Sankt Augustin

3. Standards

Source:
Beuth Verlag GmbH,
Burggrafenstraße 6, 10787 Berlin, Germany
or
VDE-Verlag GmbH,
Bismarckstraße 33, 10625 Berlin, Germany

Annex 3

Electrical rules

Where work equipment is placed on the market and first made available, it is subject to the statutory regulations transposing the relevant EU Regulations into German law in accordance with Article 95 of the EC Treaty. Work equipment encompasses machines, devices, tools and installations that are used at work. Where these statutory regulations do not apply, the other statutory regulations governing the properties of electrical equipment apply. Besides these regulations, numerous standards and other technical specifications have already been identified as recognized good practice or for description of the state of the art (refer to the successive announcements of the German Federal Ministry of Economics and Labour (BMWA) in the Federal Gazette and the Federal Labour Gazette).

These standards and specifications are also relevant to the maintenance and modification of electrical equipment, and should be regarded in this context as "electrical rules" in the sense of the BGV A3 accident prevention regulation (formerly VBG 4) concerning electrical installations and equipment.

For this reason, they are not accorded special treatment in this annex to the instructions on implementation for the BGV/GUV-V A3 accident prevention regulation (formerly VBG 4) concerning electrical installations and equipment.

The German Social Accident Insurance refers in support of the BGV/GUV-V A3 accident prevention regulation (formerly VBG 4), Section 2 (2) 1 of 1 April 1979:

1. To the relevant announcements under the above statutory regulations in the Federal Gazette and the Federal Labour Gazette
2. To the following VDE provisions governing the operation of electrical installations and equipment:
   - DIN VDE 0105-100
   - DIN VDE 0104
   - DIN VDE 0800-1

MUSTER-UVV

In this reprinted edition, the rules and regulations referred to have been updated and brought into line with the current state of the art in safety technology.

In addition, the identification number of this accident prevention regulation has been changed to BGV/GUV-V A3, owing to entry into force of the accident prevention regulation concerning “Occupational physicians and safety professionals”, to which the identification number DGUV 2 will be assigned.

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